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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,548	07/01/2004	Luzhou Xu	CN 020001	5116
24737 7590 03/28/2008 PHILIPS INTELLECTUAL PROPERTY & STANDARDS P.O. BOX 3001 BRIARCLIFF MANOR, NY 10510				
EXAMINER				
FLORES, LEON				
ART UNIT		PAPER NUMBER		
2611				
MAIL DATE		DELIVERY MODE		
03/28/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/500,548

Applicant(s)

XU ET AL.

Examiner

Leon Flores

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 January 2008.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
4a) Of the above claim(s) 8 and 12-14 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-7 and 9-11 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 5/16/2007 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 1/10/2008 have been fully considered but they are not persuasive.

Response to Remarks

Applicant asserts that, *"In the Sih patent, the frequency offset (i.e., $e(n)$ in Figure 7) is fed back to rotator (i.e., block 706 in Figure 7). Hence, its frequency compensation is done at the sample level. As described in the present specification, on the other hand, the frequency offset is forwarded to construct a compensation signal at the symbol level (see Blocks 22, 24, 25, 14 and 13 in Figure 2 of the present specification). Hence, in the present invention, compensation is done at the symbol level"*.

The examiner respectfully disagrees. Although the reference of Sih does teach compensating for frequency offsets at the sample level, the examiner does not see the advantage of implementing this correction at the sample level as opposed to the symbol level. However, taking the contrary, the examiner has issued a new ground of rejection in order to substantiate for this new limitation.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation of *"at the symbol level"* must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The drawings are objected to because drawings contain blank boxes and other shapes, which are not widely, recognized engineering symbols. Applicant must supply a suitable legend. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

The following are direct quotations of 37 CFR 1.84(n), (o), repeated below:

- (n) *Symbols.* Graphical drawing symbols may be used for conventional elements when appropriate. The elements for which such symbols and labeled representations are used must be adequately identified in the specification.
Known devices should be illustrated by symbols which have a universally recognized conventional meaning and are generally accepted in the art. **Other symbols which are not universally recognized may be used, subject to approval by the Office, if they are not likely to be confused with existing conventional symbols, and if they are readily identifiable.**
- (o) *Legends.* **Suitable descriptive legends may be used subject to approval by the Office, or may be required by the examiner where necessary for understanding of the drawing.** They should contain as few words as possible.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. **Claims (1, 6-7, 9-11) are rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (hereinafter Sih)(US Patent 6,608,858 B1) in view of Prysby et al. (hereinafter Prysby) (US Patent 6,888,878 B2)**

Re Claim 1, Sih discloses a rake receiver comprising at least two fingers (In Fig. 7: 700A & B), and a combiner (710) coupled to said fingers (704A).

But the reference of Sih fails to explicitly teach that wherein each of the at least two fingers comprises a finger compensator that compensates for frequency shift at the symbol level.

However, the reference of Sih does teach compensating for frequency offsets at the sample level. The examiner does not see the difference/advantage of providing frequency offset compensation at the symbol level, as opposed to at the sample level if the objective is to compensate for the channel impairments.

Therefore, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Sih, in the manner as claimed, for the benefit of compensating for the channel impairments.

Re Claim 6, the reference of Sih further teaches that most fingers each comprise a finger compensator, with all finger compensators together forming said compensator. (In Sih, see fig. 7)

Re Claim 7, the reference of Sih further teaches that said rake receiver comprises a mixer for converting intermediate frequency signals into baseband signals, which mixer comprises an oscillator input coupled to a stable oscillator (In Sih, see fig. 2, where a mixer 112 and an oscillator 220 are disclosed for converting IF signals to baseband signals).

Claim 9, has been analyzed and rejected w/r to claim 1 above. Furthermore, the reference of Sih pertains to a CDMA communications system comprising base stations and mobile units. Communications between base stations and mobile units is by way of mobile telephone switching office (MTSO) and public switch telephone network (PSTN) (In Sih, see col. 1, line 49-55).

Claim 10 has been analyzed and rejected w/r to claim 9 above.

Claim 11 has been analyzed and rejected w/r to claim 9 above.

Claims (2 & 3) are rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (hereinafter Sih)(US Patent 6,608,858 B1), as applied to claim 1 above, and further in view of Ling et al. (hereinafter Ling) (US Patent 6,363,102 B1)

Re Claim 2, the reference of Sih fails to specifically disclose that said finger compensator comprises a filter and an amplitude normalizer coupled serially for receiving an input symbol signal and for generating an output symbol signal.

However, Ling does. (See fig. 3: 160 & col. 7, lines 34-45) Ling discloses a filter and an amplitude normalizer coupled serially for receiving an input symbol signal and for generating an output symbol signal. (See fig. 3: 160) Furthermore, one skilled in the art would know that amplitude normalizer or coefficients are inherent features within a filter.

Therefore, taking the combined teachings of Sih, Prysby and Ling as a whole, it would have obvious to one of ordinary skill in the art to further incorporate a filter and an

amplitude normalizer in the manner as claimed into the system of Sih, and as taught by Ling, for the benefit of producing an estimate of the channel. (See col. 7, lines 34-35)

Re Claim 3, the combination of Sih and Ling further discloses that said finger compensator further comprises a first arithmetical module for multiplying said input symbol signal with a conjugated previous input symbol signal (In Ling, see fig. 2: 140) and a second arithmetical module for multiplying said output symbol signal with a previous output symbol signal as claimed. (It is notoriously well known in the art that in order to mitigate multi-path interference, it is imperative that an auto correlation be performed on a delayed signal and the signal itself.)

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (hereinafter Sih)(US Patent 6,608,858 B1) and Ling et al. (hereinafter Ling) (US Patent 6,363,102 B1), as applied to claim 2 above, and further in view of Ishizu et al. (hereinafter Ishizu) (US Publication 2002/0015438 A1)

Re Claim 4, the combination of Sih and Ling further teaches a rake receiver characterized in that said at least one finger comprises a pilot channel correlator and a traffic channel correlator (In Ling, see fig. 1: 120 & 130).

But the combination of Sih and Ling fails to specifically disclose an output of said finger compensator being coupled to first inputs of a third and fourth arithmetical module, of which second inputs are coupled to outputs of said correlators.

However, Ishizu does. (See fig. 14: 3d & 3e, paragraph 10) Ishizu discloses a an output of said finger compensator being coupled to first inputs of a third and fourth

arithmetical module (See fig. 14: the output of element 3c is coupled to elements 3d & 3e, and the output of each despreader, elements 3a & 3b, are second inputs to elements 3d & 3e), of which second inputs are coupled to outputs of said correlators.

Therefore, taking the combined teachings of Sih, Prysby, Ling, and Ishizu as a whole. It would have obvious to one of ordinary skill in the art to have modified the system of Sih, as modified by Ling, and as taught by Ishizu, for the benefit of providing phase compensation. (See paragraph 10)

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (hereinafter Sih)(US Patent 6,608,858 B1), Ling et al. (hereinafter Ling) (US Patent 6,363,102 B1), and Ishizu et al. (hereinafter Ishizu) (US Publication 2002/0015438 A1), as applied to claim 4 above, and further in view of Huang et al. (hereinafter Huang) (US Patent 6,154,443)

Re Claim 5, the combination of Sih, Ling, and Ishizu further teaches wherein said at least one finger comprises an averaging unit (In Sih, see Fig. 7: 710), an input (of the average unit) is coupled to an output of said third arithmetical module (In Ishizu, see fig. 14: the output of element 3e is coupled to a combiner).

But the combination of Sih, Ling, and Ishizu fails to teach that, and of which an output is coupled to a first input of a fifth arithmetical module, of which a second input is coupled to an output of said fourth arithmetical module.

However, Huang does. (See Fig. 2A) Huang teaches a CDMA rake receiver that computes a data detection using FFT matched filters. The rake receiver is comprised of

a pilot signal spreading code matched filter, data signal spreading code matched filter, channel frequency response estimation unit, channel matched filter, and a pilot interference cancellation unit. The input of the average unit 104, in Huang et al., is coupled to a delay unit 102 & a multiplier 72. And the output of the average unit 104 is coupled to reserve main paths unit 106, complex conjugate 100, and multiplier 96. There is a second input coupled to unit 96 that comes from another multiplier unit 88. Unit 88 is responsible for despreading the data signal. The examiner is taking into consideration that elements 13, 14 & 16 in the applicant's application correspond to elements 72, 88, & 96 respectively of Huang.

Therefore, taking the combined teachings of Sih, Ling, Ishuzu and Huang as a whole. It would have been obvious to one of ordinary skill in the art to incorporate an input (of the average unit) is coupled to an output of said third arithmetical module and of which an output is coupled to a first input of a fifth arithmetical module, of which a second input is coupled to an output of said fourth arithmetical module as claimed into the system of Sih, as modified by Ling, and Ishuzu, for the benefit of obtaining compensation due to multi- path interference as noted in Huang (see Summary of the Invention).

7. Claims (1, 6-7, 9-11) are rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (hereinafter Sih)(US Patent 6,608,858 B1) in view of Prysby et al. (hereinafter Prysby) (US Patent 6,888,878 B2)

Re Claim 1, Sih discloses a rake receiver comprising at least two fingers (In Fig. 7: 700A & B), and a combiner (710) coupled to said fingers (704A).

But the reference of Sih fails to explicitly teach that wherein each of the at least two fingers comprises a finger compensator that compensates for frequency shift at the symbol level.

However, Prysby does. (See fig. 1: 101 & 103) Prysby discloses a plurality of RAKE fingers that provide time and phase compensation at the symbol level. Furthermore, one skilled in the art would know that frequency is related to the phase.

Taking the combined teachings of Sih and Prysby as a whole, it would have been obvious to one of ordinary skills in the art to incorporate this feature into the system of Sih, in the manner as claimed and as taught by Prysby, for the benefit of compensating for the channel impairments.

Re Claim 6, the combination of Sih and Prysby further teaches that most fingers each comprise a finger compensator, with all finger compensators together forming said compensator. (In Sih, see fig. 7)

Re Claim 7, the combination of Sih and Prysby further teaches that said rake receiver comprises a mixer for converting intermediate frequency signals into baseband

signals, which mixer comprises an oscillator input coupled to a stable oscillator (In Sih, see fig. 2, where a mixer 112 and an oscillator 220 are disclosed for converting IF signals to baseband signals).

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Therefore, taking the combined teachings of Sih, Prysby and Ling as a whole, it would have obvious to one of ordinary skill in the art to further incorporate a filter and an amplitude normalizer in the manner as claimed into the system of Sih, as modified by Prysby, and as taught by Ling, for the benefit of producing an estimate of the channel. (See col. 7, lines 34-35)

Re Claim 3, the combination of Sih, Prysby, and Ling further discloses that said finger compensator further comprises a first arithmetical module for multiplying said input symbol signal with a conjugated previous input symbol signal (In Ling, see fig. 2: 140) and a second arithmetical module for multiplying said output symbol signal with a previous output symbol signal as claimed. (It is notoriously well known in the art that in order to mitigate multi-path interference, it is imperative that an auto correlation be performed on a delayed signal and the signal itself.)

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (hereinafter Sih)(US Patent 6,608,858 B1), Prysby et al. (hereinafter Prysby) (US Patent 6,888,878 B2), and Ling et al. (hereinafter Ling) (US Patent 6,363,102 B1), as applied to claim 2 above, and further in view of Ishizu et al. (hereinafter Ishizu) (US Publication 2002/0015438 A1)

Re Claim 4, the combination of Sih, Prysby, and Ling further teaches a rake receiver characterized in that said at least one finger comprises a pilot channel correlator and a traffic channel correlator (In Ling, see fig. 1: 120 & 130).

But the combination of Sih, Prysby and Ling fails to specifically disclose an output of said finger compensator being coupled to first inputs of a third and fourth arithmetical module, of which second inputs are coupled to outputs of said correlators.

However, Ishizu does. (See fig. 14: 3d & 3e, paragraph 10) Ishizu discloses a an output of said finger compensator being coupled to first inputs of a third and fourth arithmetical module (See fig. 14: the output of element 3c is coupled to elements 3d & 3e, and the output of each despreader, elements 3a & 3b, are second inputs to elements 3d & 3e), of which second inputs are coupled to outputs of said correlators.

Therefore, taking the combined teachings of Sih, Prysby, Ling, and Ishizu as a whole. It would have obvious to one of ordinary skill in the art to have modified the system of Sih, as modified by Prysby and Ling, and as taught by Ishizu, for the benefit of providing phase compensation. (See paragraph 10)

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sih et al. (hereinafter Sih)(US Patent 6,608,858 B1), Prysby et al. (hereinafter Prysby) (US Patent 6,888,878 B2), Ling et al. (hereinafter Ling) (US Patent 6,363,102 B1), and Ishizu et al. (hereinafter Ishizu) (US Publication 2002/0015438 A1), as applied to claim 4 above, and further in view of Huang et al. (hereinafter Huang) (US Patent 6,154,443)

Re Claim 5, the combination of Sih, Prysby, Ling, and Ishuzu further teaches wherein said at least one finger comprises an averaging unit (In Sih, see Fig. 7: 710), an input (of the average unit) is coupled to an output of said third arithmetical module (In Ishizu, see fig. 14: the output of element 3e is coupled to a combiner).

But the combination of Sih, Prysby, Ling, and Ishuzu fails to teach that, and of which an output is coupled to a first input of a fifth arithmetical module, of which a second input is coupled to an output of said fourth arithmetical module.

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Therefore, taking the combined teachings of Sih, Prysby, Ling, Ishuzu and Huang as a whole. It would have been obvious to one of ordinary skill in the art to incorporate an input (of the average unit) is coupled to an output of said third arithmetical module and of which an output is coupled to a first input of a fifth arithmetical module, of which a

second input is coupled to an output of said fourth arithmetical module as claimed into the system of Sih, as modified by Prysby, Ling, and Ishuzu, for the benefit of obtaining compensation due to multi- path interference as noted in Huang (see Summary of the Invention).

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leon Flores whose telephone number is 571-270-1201. The examiner can normally be reached on Mon-Fri 7-5pm Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Payne can be reached on 571-272-3024. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LF
January 30, 2008

/David C. Payne/
Supervisory Patent Examiner, Art Unit 2611

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